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REDISCOVERY OF *PLATEILEMA PALMERI* (ASTERACEAE) IN BREWSTER COUNTY, TEXAS

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ABSTRACT

Plateilema palmeri (A. Gray) Cockrell is a little understood and infrequently documented species of the composite family known from a few collections in Coahuila and Nuevo León, Mexico, and in the USA. This species has not been observed in the USA since 1929, when two specimens were collected by Henry T. Fletcher in west-central Brewster County, Texas. A population was rediscovered in 2014, growing within a long-term grassland restoration site approximately 70 km south of Alpine, Texas. Analysis of these plants revealed an identical chromosome number to a population in Mexico, $2n = 26$. Continuing field studies have documented a number of additional populations of *P. palmeri* throughout similar habitats in the desert grassland area known as the Green Valley on the O2 Ranch in Brewster County.

Plateilema palmeri (A. Gray) Cockrell has been known only from a few localities in Coahuila and Nuevo León, Mexico and historically from Brewster County, Texas (Turner 2000; Powell & Spellenberg 2013). It is the only representative of the genus, which is positioned in the tribe Helenieae (Strother 2006).

Until recently, the species had remained unobserved in the United States for more than 85 years. Within the USA, prior documentation was known only from specimens collected in west-central Brewster County, Texas, by Henry T. Fletcher in April 1929. At that time, Fletcher was a manager and partner of the O2 Ranch, located ca. 50 km south of Alpine, Texas (Keller 2005) (Fig. 3A). Fletcher possessed a keen interest in botany and collected many specimens from the area, mostly now deposited at SRSC (Turner 2000; Powell & Spellenberg 2013). Fletcher collected two specimens of *Plateilema palmeri* on the same day, according to specimen labels (Turner 2000). Both collections were made ca. 70 km south of Alpine, Texas, on what is now the O2 Ranch (10 Apr 1929, *H.T. Fletcher 219*, SRSC; 10 Apr 1929, *H.T. Fletcher 884*, SRSC).

On 12 August 2014, Sul Ross State University graduate student Chris Jackson rediscovered a group of individuals of the species growing within an experimental vegetation plot on the O2 Ranch. This population was located ca. 4 km west of one of the Fletcher collections (*Fletcher 219*). As part of a long-term grassland restoration study, Jackson was performing vegetation surveys and identifying all broad-leaved, herbaceous plants found within experimental plots. Identification

proved initially unsuccessful as *Plateilema palmeri* is not included in the Manual of the Vascular Plants of Texas (Correll & Johnston 1970), but the specimen subsequently was brought to the attention of the second author, who identified it as *P. palmeri*. The voucher label data are included here.

> **Texas. Brewster Co.:** ca. 70 km S of Alpine, ca. 4 km W of TX 118, O2 Ranch, elev. 1143 m, fine clay deposits within a broad, alluvial basin ("tobosa flats") near base of *Prosopis glandulosa* var. *torreyana* and along edge of perennial grass community in debris deposited by recent overland flows, other associates include *Larrea tridentata, Parthenium confertum, Flourensia cernua, Cylindropuntia leptocaulis, Pleuraphis mutica, Hopia obtusa, Setaria leucopila, Muhlenbergia arenacea, Scleropogon brevifolius, Bouteloua curtipendula, Hoffmanseggia glauca, Acourtia nana, Senna pumilio, Chamaesyce serrula,* and *Heliotropium greggii*, 12 Aug 2014, *C. Jackson 170* (SRSC).

The area where *Plateilema palmeri* individuals have been documented on the O2 Ranch lies within a broad, alluvial basin known locally as the Green Valley. The Green Valley is characterized vegetatively as Chihuahuan Desert Scrub (Powell & Spellenberg 2013); physiognomy is that of a desert grassland (tobosa flats). Common species observed here include *Bahia absinthifolia, Flourensia cernua, Parthenium confertum, Heliotropium greggii Cylindropuntia leptocaulis, Prosopis glandulosa* var. *torreyana, Sphaeralcea angustifolia, Oenothera suffrutescens, Muhlenbergia arenacea, Pappophorum vaginatum, Pleuraphis mutica, Scleropogon brevifolius, and Larrea tridentata.* The structure of the vegetation community in this area often forms banded vegetation patterns (Fig. 4A), which are discrete, elongated patches of vegetation occurring on landforms with very low slopes (ca. 1%), oriented in parallel to the slope contour and typically occurring in arid and semiarid areas (Warnock 1997; d'Herbès et al. 2001). Banded vegetation may be the preferred habitat for *P. palmeri* (Fig. 4B), because the most robust specimens and largest groups have been found within these microhabitats (Fig. 5A).

Jackson was accompanied by A.M. and Shirley Powell in following field outings. Their collections of flower buds from *Plateilema palmeri* specimens within an area of ca. 1,288 hectares on the 02 Ranch yielded chromosome counts from four populations. The chromosome number is identical to that first reported for a population in Coahuila, Mexico (Powell & Spellenberg 2013). Buds were fixed in Modified Carnoy's solution (4:3:1; chloroform: absolute ethanol: glacial acetic acid). Meiotic chromosome counts were made by the second author. Voucher specimens for chromosome counts (SRSC) are indicated here.

> **$2n = 26$ (13II)**, all four populations. Brewster Co.: (1) ca. 70 km S of Alpine, ca. 4 km W of TX 118, O2 Ranch, 15 Aug 2014, *Powell & Powell* and *Jackson 7108*; (2) ca. 70 km S of Alpine, ca. 4 km W of TX 118, O2 Ranch, ca. 100 m E of site for *Powell et al. 7108*, 15 Aug 2014, *Powell & Powell* and *Jackson 7111*; (3) ca. 62 km S of Alpine, ca. 1 km W of TX 118, O2 Ranch, 30 Aug 2014, *Powell & Powell, Jackson,* and *Jones 7143; (*4) ca. 64 km S of Alpine, E of TX 118, O2 Ranch, 14 Sep 2014, *Powell & Powell, Jackson,* and *B. Warnock 7149.*

Since the rediscovery, Jackson has continued work in documenting the distribution of *Plateilema palmeri* on the O2 Ranch. To date, ca. 1,800 individual plants have been located within an area spanning ca. 4,047 hectares. Current mapping of *P. palmeri* populations suggests that distribution may be limited to fine, clay loam soils deposited from calcareous parent materials, mainly from marl, mudstone, shale, limestone, and calcareous tuffs deposited during the Cretaceous-Paleogene Periods (K/PG boundary) (Goldich & Elms 1949; USDA 2013). The majority (~98%) of individuals have been documented in the Cesario and Fizzleflat loam soils within the Loamy Desert Grassland ecological site, R042XC250TX (Fig. 3B) (USDA 2012).

Figure 1. Habit of *Plateilema palmeri*. A. Initial voucher specimen collected on 12 Aug 2014. B. Group of individuals growing in area treated by prescribed fire beneath burned *Prosopis glandulosa* var. *torreyana*. C. Example of large basal rosette with evidence of herbivory (*Jackson 286*, SRSC). D. Example of contrast in size of individuals; coin is a USA quarter.

Figure 2. A. Habit of very small individual of *Plateilema palmeri*. B. Habit of individual with long peduncle (*Jackson 218*, SRSC). C. Example of individual with multiple heads. D. Male long-horned bee visiting *P. palmeri* at anthesis; bee identified tentatively as *Melissodes* sp.

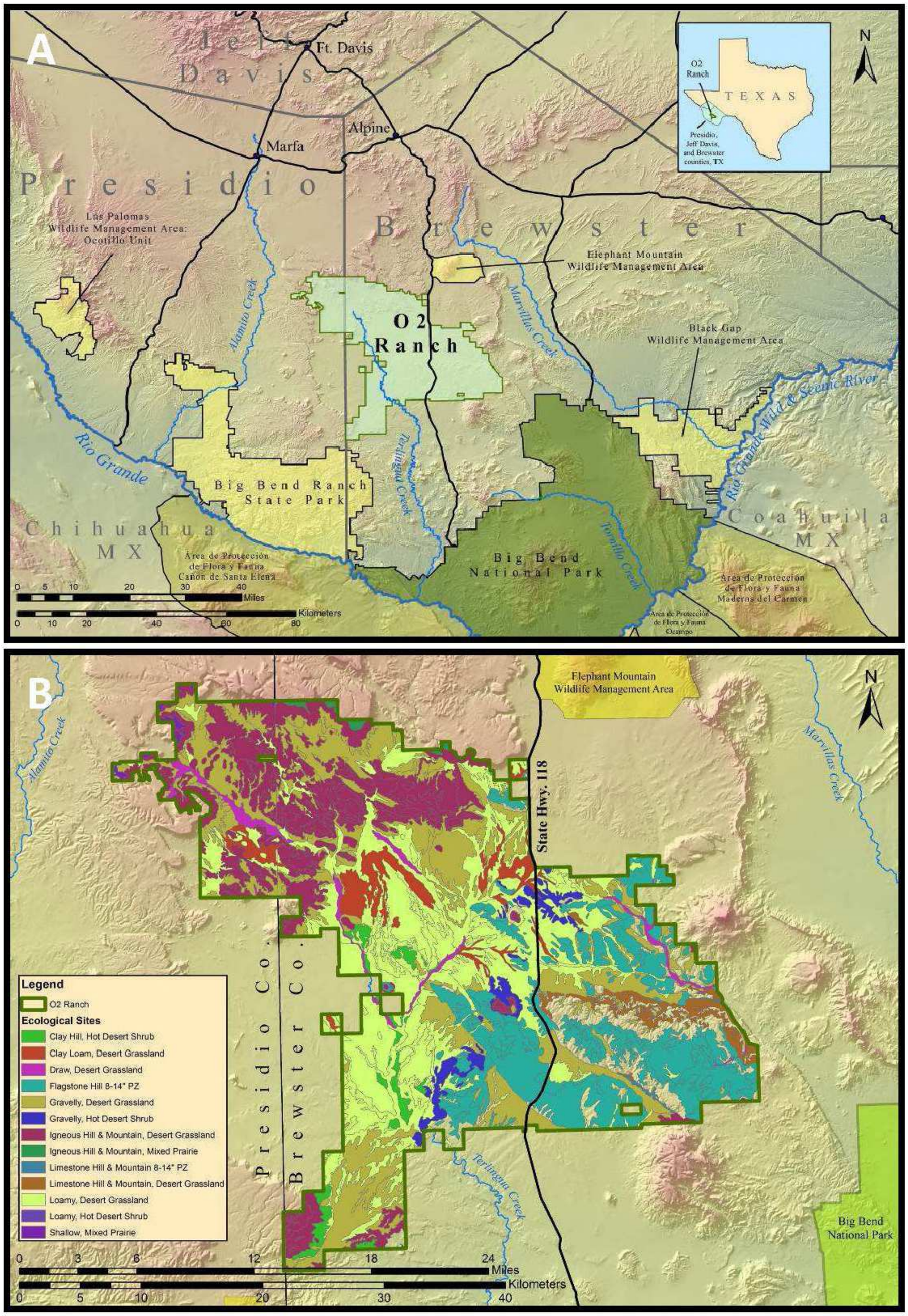

Figure 3. A. Location of the O2 Ranch in the Big Bend region of Texas. B. Ecological sites found on the O2 Ranch. *Plateilema palmeri* plants have been documented primarily in the Loamy Desert Grassland Ecological Site (indicated by light green color).

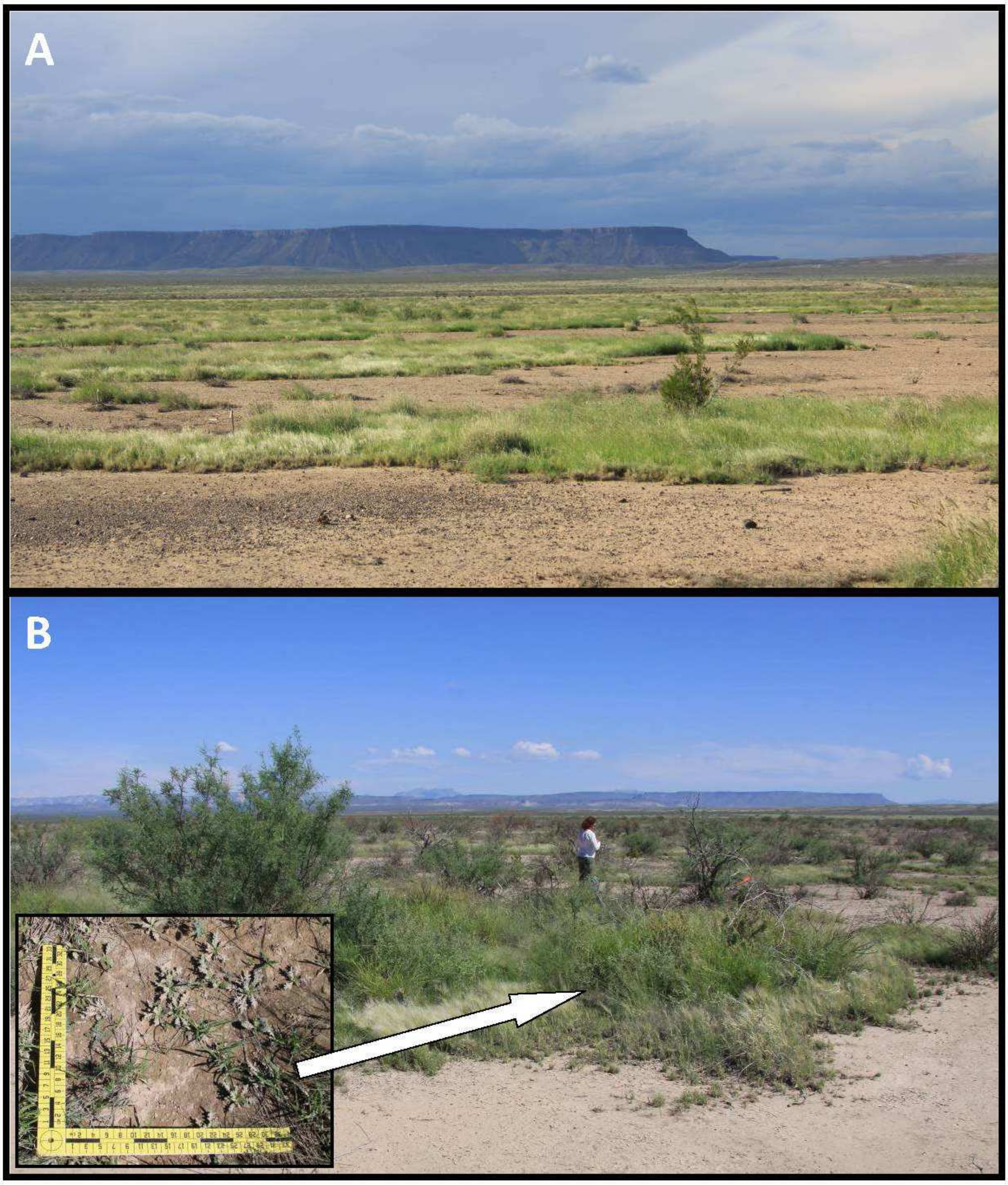

Figure 4. A. Example of banded vegetation pattern and habitat of *Plateilema palmeri* in the Green Valley (O2 Ranch); prior to restoration treatments, this rangeland was impacted by woody plant encroachment. B. Further example of banded vegetation habitat, *P. palmeri* often found growing within small clearings (inset) in banded vegetation.

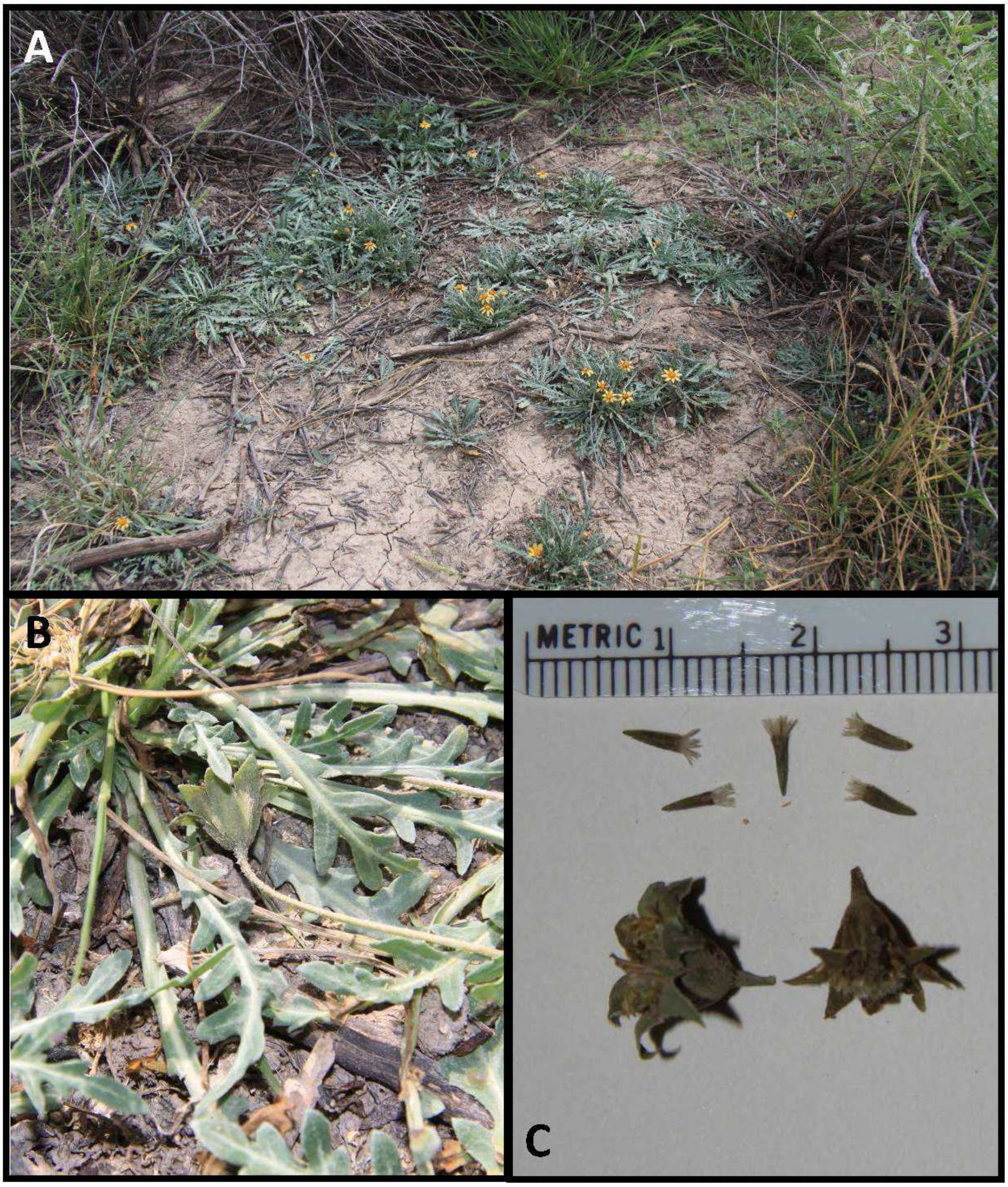

Figure 5. A. Robust group of *Plateilema palmeri* growing in open space within banded vegetation. B. Mature head lying on the soil surface; peduncle collapse appears to be the common aspect at maturity. C. Mature cypselae and heads.

Plans for further study of *Plateilema palmeri* on the O2 Ranch include further mapping of species distribution, documenting presence/absence within additional soil types and ecological sites, pollination ecology, species dispersal and recruitment, documentation of herbivory, soil analysis and moisture requirements, and chemical analysis of plant tissues. Jackson is currently proposing a biological study of *P. palmeri* to meet the requirements of his Master's thesis under the direction of Bonnie J. Warnock.

A large number of documented individuals of *Plateilema palmeri* occur within restoration treatment areas on the O2 Ranch. It is unclear if these treatments may influence the presence or abundance of this species, yet it may be safe to assume that this species can withstand disturbance, because mechanical grubbing, tebuthiuron treatments, and prescribed burning have been implemented within areas of known *P. palmeri* distribution on the O2 Ranch. Additionally, livestock are present within this area, although stocking rates are kept at a sustainable level (Bonnie J. Warnock, pers. comm., 1 Jul 2014). It is fortuitous that the owners of the O2 Ranch, Lykes Bros. Inc., have the foresight to use sound land stewardship principles in their management of this vast, privately owned ranch and have partnered with Warnock (Sul Ross State University) in restoring a degraded ecosystem in the biologically diverse, northern Chihuahuan Desert.

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